FAA GENERAL AVIATION NEWS

JANUARY 1977

A FLIGHT STANDARDS SAFETY PUBLICATION FOR AIRMEN

Sharpening The Approach

COVER:

New uses for old NAVAIDS

FAA GENERAL AVIATION NEWS

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CONTENTS/January 1977

3 Wooden Wings

7 Status of FARs

8 Radar Myth-Conceptions

10 Visual Descent Point: A New Approach

12 Famous Flyers: Indestructible Eddie

13 Briefs

14 News Log: Waivers No Longer Required For Wearers of Contact Lenses . . . Metal Fatigue Rules Under Study . . . Security Keeps Skyjacking Down . . . Four States Will Test-Manage General Aviation ADAP Funds . . . Unneeded Airport Lights Out . . . ADAP-Approved NAVAIDS Listed

15 Flight Forum

Three men on a scope P. 8

Straw hats in the wind P. 12

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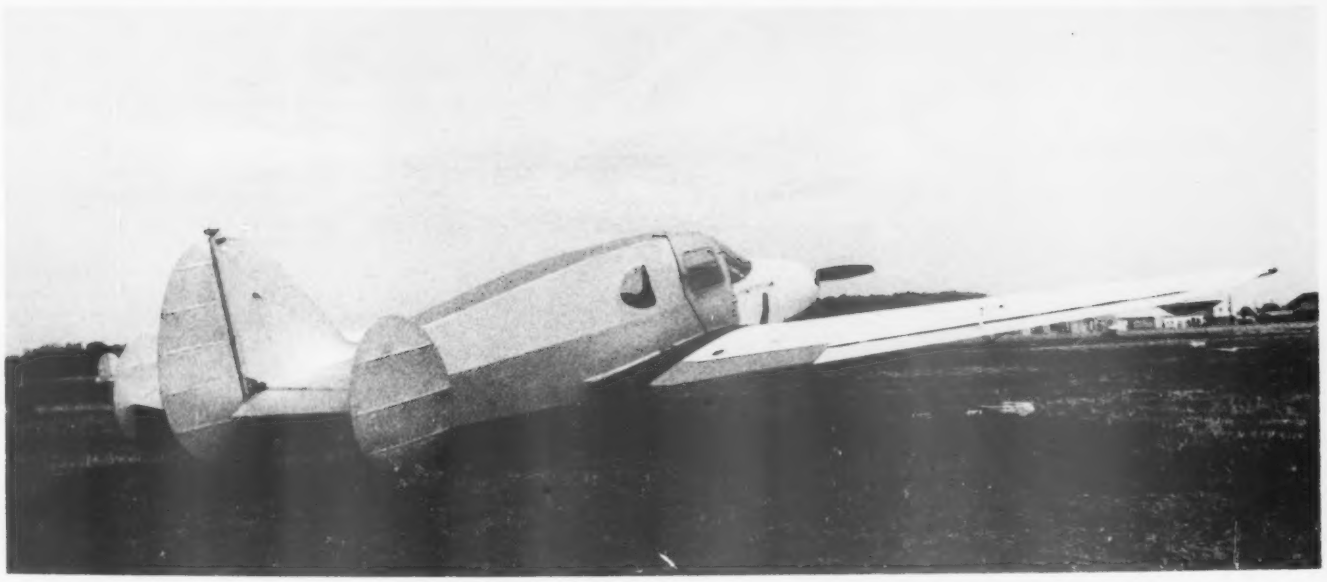


WOODEN WINGS

A little damp will do you in

When you mention wood-constructed aircraft many people immediately think of the pioneer days of aviation and antiques like the old Curtiss *Jenny*, but actually there are still hundreds of antique and contemporary wooden aircraft being flown today. Contemporary designs utilizing wooden structural parts are built by several manufacturers and an increasing number of homebuilt aircraft employ wood to some degree.

Those who fly aircraft with wood components are convinced of its advantages over the use of metal in construction. Amateur workers say it is easier and more economical to work with and repair than metal. They note that wood is more pliable and can be more easily molded. They also point out that wood never *fatigues*, whereas metal can suffer fatigue and fatigue cracks.

However, despite these advantages, there is one unique problem which weakens the case for wood—wood can rot. If this happens and it goes undetected, then during flight, particularly in turbulence, some critical structure of the airplane may snap. If that happens you may receive an impromptu lesson in the art of landing an aircraft with portions of the wing or tail missing.

Such was the case of a Mooney *Mark 20A*, vintage 1957, recently purchased in western Massachusetts and lately given a new paint job at a shop nearby. The new owner and his son arranged to fly the aircraft back to their home field at Westfield, Mass., as soon as the paint was dry. The *Mark 20A* is of plywood construction covered with fabric with wooden spars and structures in the wing and empennage.

The new owner was also a new pilot, with only 60 hours of flying time, but he was a mechanic by trade and when he found his airplane sitting in a leaky, rain-soaked hangar he knew he had cause for concern. But after cleaning and drying the aircraft and inspecting it as well as he could, he found no sign of trouble. So he and his son concluded the preflight check and took off at 2:35 p.m. for the short, 20 mile flight home to Westfield. He did not file a flight plan or obtain a weather report.

(A "weatherscope" on the airport he departed from was indicating wind gusts from 30 to 50 mph between 2:00 and 3:00 p.m. that afternoon, according to the airport management. The position of several aircraft tied down on the field had to be changed during this period as a precaution against possible wind damage.)

After takeoff the pilot climbed to 3,500 feet, hoping to find smoother air than the turbulence he had encountered near the surface. Within a few minutes he sighted Barnes Municipal Field at Westfield and he called the tower for landing instructons. He was cleared to land on Runway 20, and was preparing to start his descent when he and his son heard a loud "bang!' behind them, as if something had struck the tail.

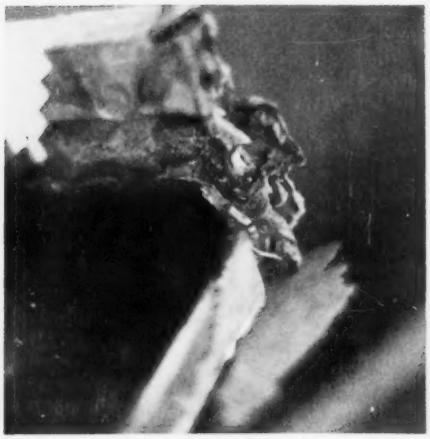
At the same time the pilot discovered he had no tension on the right rudder pedal and no elevator control. He immediately called the tower and told them his predicament. The tower responded, telling him to try to keep the aircraft level; he was not yet close enough for a visual inspection. He was then over Northampton, five miles from the airport, but he was lined up with Runway 20 and he thought for a few moments he might be able to make the field.

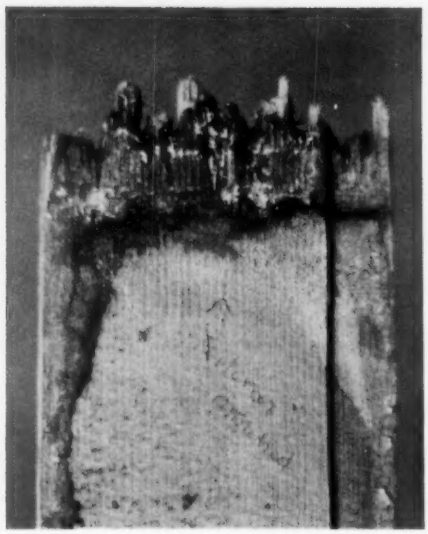
But then the Mooney suddenly swung abruptly to the left and started down in a spiraling dive. The pilot lost control of the airplane and he shouted into the microphone that they were going down.

He pulled the throttle back and continued to work at the controls as the airplane continued down. Finally, at about 200 feet the plane came out of the dive, and the pilot was able to get it into a wide spiral.

He saw a wooded area ahead and headed for it, hoping that the trees could absorb some of the force of the inevitable crash. When they got down to about 5 feet he cut the power and turned off the switches. The airplane struck the trees in a left wing-and-nose down attitude, flipped over, and came to rest in an inverted position. The Mooney was nearly demolished, but did not burn. The pilot received only minor injuries, while his son suffered a broken leg.

They felt extremely fortunate to be alive, after practically falling out of the sky from 3,500 feet. →





Damp wood offers inviting environment for germination of fungus spore. Discoloration provides tell-tale clue of wood deterioration; it should not be ignored.

The FAA maintenance inspector from the Westfield GADO, on examining the wreckage, discovered that the rudder and the vertical stabilizer were missing. The vertical stabilizer was found that same day on a sidewalk about a mile from the accident site. An appeal was made in the local newspaper for the missing rudder, and a few days later a man who was walking his dog in a field about a mile and a half from the accident site found it.

Both the rudder and the stabilizer were sent to the Department of Transportation's laboratory in Oklahoma City for examination, and the final report was quite revealing. The wooden vertical stabilizer spar showed signs of previous partial deterioration, as indicated by the discoloration of the wood. The discolored area on the right side of the spar was about one-half inch deep at both the forward edge and the trailing edge, and somewhat more extensive on the left side.

This evidence of wood decay prior to the accident, plus the occurrence of strong, gusty winds on the day of the flight, present an almost classic case of what can happen to a wood-constructed aircraft that is not properly maintained.

The Mooney's records showed that it had undergone its annual inspection the previous August, some five months before the crash. But since that time it had been parked outside, and it had only been flown for a total of 16 hours. In addition, the pilot stated that he had flown it to the paint shop on December 13th, leaving it there for six weeks. Apparently it was stored in an old World War II hangar with gaping holes in the roof, where he had found it dripping wet, but with no visible indication of damage. However, dampness is the implacable enemy of wood, and it wreaks havoc frequently under sleek and shining surfaces.

An examination of the aircraft's logs and a comparison with a list of applicable Airworthiness Directives for the Mooney *M-20A* revealed another surprising fact. The record of the annual inspection five months earlier contained no mention of compliance with a 1969 Airworthiness Directive about inspecting for wood and glue deterioration in the wooden wing and empennage structures.

That 1969 AD made compliance with an *M-20A* Mooney Service Bulletin mandatory at each annual inspection. The Bulletin warned about "an alarming number of wood repair malpractices, inadequate inspections, and unauthorized maintenance by apparently novice repairmen." The Bulletin required the removal of all the fabric from the horizontal and vertical stabilizers and a careful examination of the wood skin and glue joints for possible deterioration.

Asked by the GADO inspector about his failure to record compliance with the AD at the time of the annual, the mechanic responded that, unfortunately, he had been unaware of the AD. He stated that he had made a careful inspection of the Mooney, and there were no signs of deterioration he could spot. The decay under the skin had gone unnoticed. FAA's regional office issued a violation for his failure to comply with the AD. Of course, in flying an aircraft not in compliance with the AD (still in effect today) the owner/operator, who was also the pilot, was also subject to being cited.

Wood decay, or rot, is caused by a fungus, a form of plant life which feeds on and destroys the cellulose content and structure of the wood fibers. The seed of a fungus plant is a microscopic, airborne spore, present in almost all common environments. These spores will endure in a dormant stage for years, and spring into growth when the wood becomes damp.

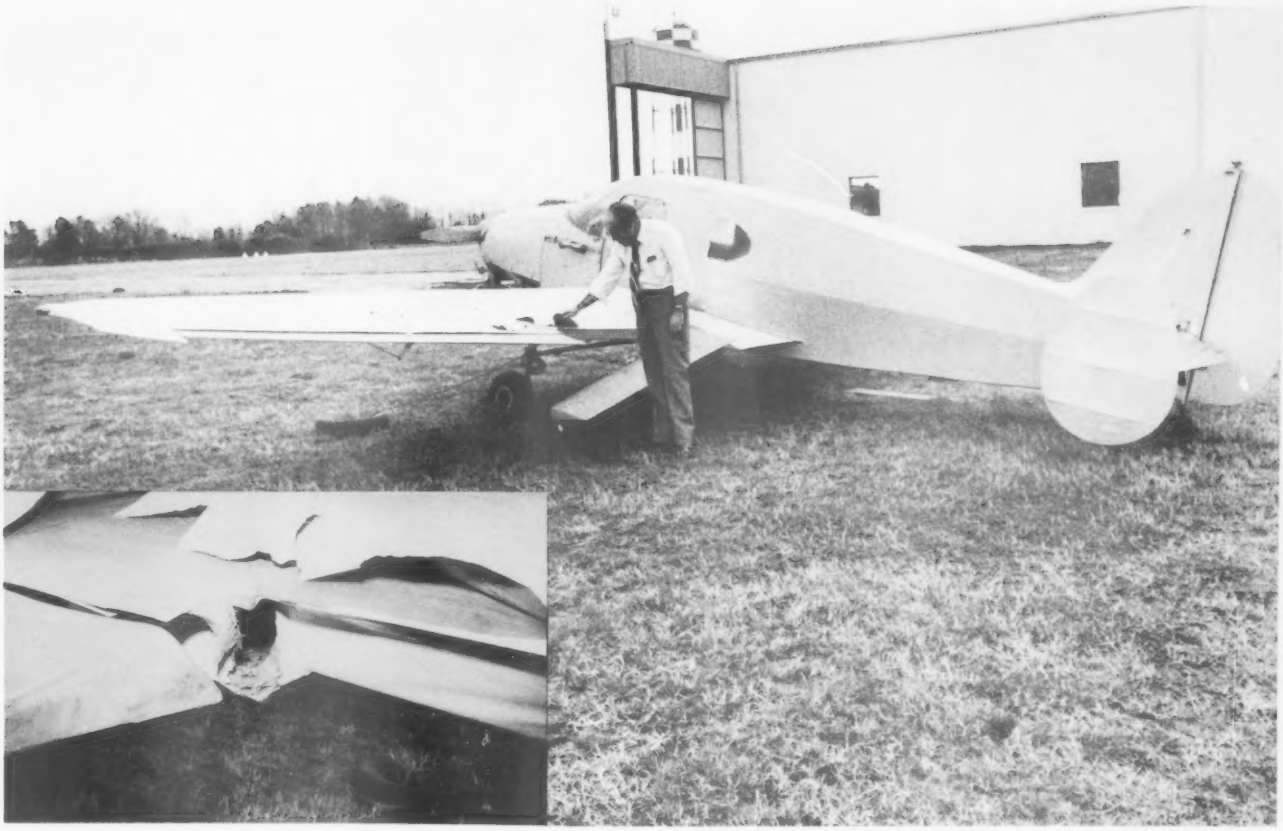
A germinating spore sends out minute hairlike strands, much like veins, which seek out the cellulose of the wood and absorb it. These filaments break down the cell walls of the wood with a resultant loss of strength. As the fungus develops, the wood darkens because the microscopic hairs then become so numerous as to form visible masses. In an advanced stage, this fungus can even produce bore holes, caused by highly localized areas of fungus which penetrate the walls of adjoining wood cells.

Incidentally, the term "dry rot" which is often used is actually a misnomer. There is no such thing as *dry* rot. There must be moisture for rot to develop in wood. The term "dry rot" seems to have originated far back in nautical history when sailors discovered powder in pieces of wood which were then dry because the whole rotting process had been completed; and they called it "dry" rot.

In the earlier days of aviation, mechanics inspected the structural wood by poking a narrow pick of some kind through the fabric and testing for the firmness of the wood beneath. This does not appear to be completely satisfactory today, however, and modern aircraft maintenance manuals usually require some type of closer inspection The Mooney Service Bulletin and AD mentioned above, for instance, require a removal of the fabric over critical structural areas for inspection of the wood, as well as cutting additional holes in the wood skin for structure inspection. And the Bulletin also notes that "discoloration penetrating into the wood grain is considered evidence of wood deterioration."

The Bulletin instructs the mechanic to sand all discolored areas to determine the depth of the penetration. He is also instructed to inspect all the glued joints which are also susceptible to deterioration, by gently flexing the parts or by tapping the joints with a small plastic mallet to listen to variations in the sounds. Some mechanics believe that visual inspection of the wooden parts is the only safe means of checking for decay or deterioration.

In the case of very minor surface deteriorations of the wood, the discolored parts can be sanded out. But any discoloration that



Well-preserved fabric on this early model Bellanca covered a multitude of decayed areas, which were revealed when the flap joint gave way. Several years of disuse and neglect while the aircraft was tied down at Tappahanock, Va., near the Chesapeake Bay, contributed to failure.

goes into the wood for more than a fraction of an inch should be viewed with suspicion. A wood component which shows signs of serious deterioration should be replaced immediately by a competent airframe mechanic who knows how to work with wood. FAA's Advisory Circular, "Aircraft Inspection and Repair," devotes its first chapter to aircraft wood structures and gives helpful advice for the mechanic who works on wood aircraft. (AC 43-13-1A is available for $3.70 from the Government Printing Office, Washington, D.C. 20402.)

In all but the driest of climates it is impossible to protect wood structures in aircraft from being attacked by fungus to some degree. But there are a number of preventive actions which can be taken to inhibit the decay process:

1. Store wooden aircraft in a hangar if possible, preferably a heated hangar, especially in winter. Admittedly this is becoming increasingly difficult today, as hangar space becomes more precious and many owners of wooden airplanes are being forced to settle for an outdoor tie-down area.
2. There are a number of good wood preservatives available today, such as copper napthenate and pentachlorophenol. Properly impregnated into the wood, these will prevent or retard deterioration. Incidentally, regular paint and varnish do not necessarily ward off wood rot. When you paint or varnish you can actually seal many spores to the surface of the wood, and moisture is capable of penetrating the painted surface under humid conditions.
3. Most wood-constructed airplanes have some drain holes at the bottom of each wood component, so that any water which has accumulated there can drain out. It is imperative that drains be kept open and unclogged so that they can perform their invaluable function of allowing water to flow out. Make certain you know the location of *all* the drain ports on your aircraft, and inspect them at every preflight check.

Problems arising from structural decay in wooden aircraft appear to be on the rise. For the five year period 1971 to 1976 there were 26 cases of structural failure due to wood rot, glue separation, or cracks reported to FAA's Service Difficulties Program on one model of wooden aircraft alone! This may represent only a portion of the total number of such problems which have cropped up. Failures of this kind can be a very serious potential hazard regardless of the number of cases reported, because of the fact that they usually occur in flight, without warning, and result in loss of control of the aircraft.

Recently an FAA maintenance inspector in Lancaster, Calif., was checking the flap bay area of a Mooney *Mark-20* by flexing the flap hinge brackets, when the bracket dropped off virtually into his hands. An inspection revealed well developed wood rot →

If prop is wood, it too should be watched for signs of decay, particularly in the critical area around the bolts.

Aircraft with wood construction can be just as safe and airworthy as their all-metal sky-mates, as long as they are maintained properly.

which apparently had begun after moisture seeped in through several screw holes at the trailing edge of the wing. Careful inspection of components during the preflight check is a good precaution against inflight separation. The owner of this aircraft was lucky—a takeoff run over rough ground might easily have resulted in a disastrous structural failure in the air. Note that Lancaster is located at the edge of the Mojave Desert, not exactly an environment where you would expect problems with rot.

Less fortunate were the two occupants of another aircraft with wood components, flying out of Sussex, N.J. The aircraft was a Bellanca 17-30, the pilot a 37 year old contractor with a commercial certificate and some 600 hours of flight time. He and his passenger set out on a Sunday morning local pleasure flight and were flying level at about 3,000 feet when they heard a sharp cracking sound and to their horror saw the entire right wing break off. The aircraft nosed over immediately and fell off into a tight spiral dive, out of control and culminating in a violent crash. Both occupants were killed on impact.

Once again, turbulence apparently played a role in triggering the wing failure. Another pilot flying a light plane in the area at about the same time reported experiencing light to moderate turbulence, which may have placed more of a load on the wing than it was capable of carrying in its current condition.

However, the report of the National Transportation Safety Board investigators established "inadequate inspection of the aircraft" as the probable cause of the accident:

"Structural examination of this airplane's all-wood wing disclosed significant decay of the right front spar. It was obvious from the rusty fasteners, drying checks, and surface stains that water had leaked inside the wing. Sections of the failed right wing were sent to the United States Forest Products Laboratory at Madison, Wisc., for further examination. The laboratory's technical staff substantiated the fact that the front spar was moderately to heavily decayed as a result of fungus infection; they believed, after considering the conditions associated with the accident airplane, that this decay would have required two years or longer to develop. . . ."

The deterioration, according to the Forest Products Laboratory, would have required standing water in the wing spar area. The Board concluded that . . . "Since the design of the wing would normally prevent entrapment of water, even under adverse environmental storage conditions, water probably leaked into the wing's interior as a result of a maintenance-related mechanical impairment—e.g., cracked paint, fabric or plywood wing covers." Cracked fabric, the Board noted, is particularly suspect, since such fabric cracks are often caused by cracks or other faults in the wing cover itself. Water may also leak into the wing through deteriorated or improperly installed seals around the neck of the fuel filler pipe, which is recessed enough to hold considerable standing water.

Wooden aircraft, no doubt, have their special virtues and deserve the loyal and persistent following they enjoy among purchasers of type-certified planes as well as amateur builders. They can be flown safely as long as they are maintained safely. Maintenance of wooden aircraft requires some special precautions, including the following:

- *Keep the aircraft as clean and dry as possible (dirt and moisture promote fungus growth).*
- *Keep an effective waterproof coat of paint on the skin and do not allow breaks or cracks to go unremedied. If you buy a wooden aircraft with cracked paint, have the fabric or panels removed for a thorough inspection of the spars before flying it or repainting.*
- *A similar inspection is in order for any wooden aircraft that has been standing outside over the winter, or kept in a damp, unheated hangar. Given enough time, moisture will penetrate virtually any surface. Interior inspection costs more than eyeballing the surface, but it lets you fly with a sense of assurance and peace.*

It is not the heat, or cold, but the humidity that can cripple your little wooden bird. ■

FARs

The Federal Aviation Regulations have been re-issued as individual Parts. Frequently amended Parts are sold on subscription; changes (latest numbered in parenthese) are sent out gratis to subscribers. Infrequently amended Parts are sold as single sale items; the changes are sold separately. FARs may be purchased only from the Superintendent of Documents, GPO, Washington, D.C. 20402.

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** Due to the complexity, length, and frequency of issuance, airworthiness directives, en route IFR altitudes and standard instrument approach procedures are published in the Federal Register and are not included in basic Parts 39, 95, and 97. In addition, en route IFR altitudes and instrument approach procedures are depicted on aeronautical charts.

Standard instrument approach procedures are published in the Federal Register by reference to FAA documents which are available for examination at the Rules Docket (AGC-24) and the National Flight Data Center. in FAA Headquarters, Washington, D.C. and at FAA regional offices and Flight Inspection District Offices.

What instructors have been preaching for years is still true: the only device that will ever eliminate VFR mid-airs is the eyeball, mounted on a constant-swivel, ever-thinking head.

On being aware of some holes in the Airman's Security Blanket

RADAR MYTH-CONCEPTIONS

It is one of those ideal weather, built-for-flying afternoons. You are cruising along VFR, no clouds, no worries . . . then in an instant, the unthinkable: aluminum overcast for a millisecond—a wing, a blur of numbers, another pilot's face flashes by, mirroring your horror. Then he is gone as quickly as he came, leaving stillness and empty blue skies in his place.

You have come face to face with a pilot's nightmare, a near mid-air collision, and you will never be the same again. It is frightening. You are weak, you are scared, your hands are trembling. Then you feel angry and keep getting angrier—you grumble: *They spend millions on exotic ATC radar, everyone knows, but there was no warning, none of the "advisory service" advertised. They can program computers to read an aircraft's altitude and flight number without a word being spoken. But they didn't warn you—or the other guy, presumably, that you were dead on target for an aerial smashup. What's wrong with this elaborate, expensive system, anyway?*

The answer is that nothing is wrong with the modern air traffic control radar system, except possibly the airman's conception of it, what it can and cannot do. The continuing development of more sophisticated and automated equipment has given rise to the notion among some pilots that controllers are watching their every move enroute, and will always be able to warn other aircraft—particularly those flying IFR—of their presence. This is the misconception that can kill you.

The adoption of radar into air traffic control brought with it a series of increased capabilities which have continued over its 20 year history. From the earliest days, when radio operators had to guess at locations, times and speeds of aircraft, we have gone through "raw" radar to transponders to modern computer-augmented machinery that can spit out a wealth of information on command, right on the controller's scope.

These new radar/computer capabilities have unquestionably enriched the capabilities of the airway system and brought us closer to the much desired day when collision avoidance for virtually all aircraft will be practical. But the glowing wonders of each new radar or its added capabilities encourages some of us to overlook the fact that current radar is *not* all-encompassing in its coverage, does *not* pick up all aircraft at all times, and is primarily concerned with the separation of IFR traffic.

Originally developed during World War II, radar (Radio Detection and Ranging) had as its initial purpose not the separation of aircraft, but detection of enemy aircraft. (See "The Big Eye," FAA GENERAL AVIATION NEWS, August 1975) Later developments resulted in radar being used for the positioning of aircraft. Fighters were joined up with the bombers they protected in this way, and many other uses were found for radar. Most of the research aimed at improving the outer range, ignoring the "ground clutter"—the undesirable returns from nearby trees, fences, etc., which covered the center of the scope.

After the war ended and radar found its way into air traffic control, ground clutter became an increasingly serious problem for terminal radar. Some of today's most sophisticated black box circuitry is aimed at reducing this phenomenon. Modern radar does a magnificent job compared to the old days, but clutter is still there. One way of reducing it to a minimum results in weakening radar's sensitivity to certain distant aircraft targets. The person affected in this trade-off is the pilot flying an airplane whose radar-reflecting properties are weakest. This group includes many small general aviation airplanes flying VFR without active transponders. In some situations these aircraft are not "painted" on the radarscope, even though they are within range of the transmitter.

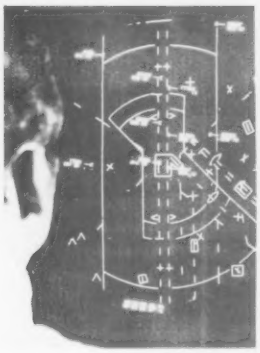
Some pilots think of IFR as a kind of security blanket. They say to themselves, "I'm on an IFR flight plan; therefore the air traffic service is going to tell me about all the traffic I might encounter." So they settle back in their seat in imagined safety.

Who is Responsible

The fact is that when operating in VFR conditions, regardless of flight plan, *responsibility for seeing and avoiding other traffic rests with the pilot, not the controller.* Civilian radar was developed primarily for the separation of IFR traffic from other IFR traffic. That is still the controller's prime responsibility, although he will also assist VFR traffic as much as time and facilities permits, calling the pilot's attention to any known potential problem or immediate hazard. Radar advisory service for aircraft is specifically designated as a duty that follows the priorities of separation, safety advisories, and other required controller actions, to be performed on a workload permitting basis only. Furthermore, at any given time the

Photo by Don Braun

Left—in the IFR room at Washington National, radar controller is concerned with traffic approaching that airport and also nearby Andrews AFB. Below—computer generated data-tag printouts immediately identify transponder equipped IFR aircraft.



controller may not be getting any return from your aircraft—or from your potential traffic.

But, you ask *what about that VFR day when you were level at 4,500—certainly high enough to be in coverage—and Center missed telling you about the T-38 that nearly skewered you? Traffic was light, so you know the controller should have had time to help you.*

Believe it or not, there are days when the weather is "good" for flying, but maybe not so good as far as radar is concerned. Wind, temperatures aloft (particularly when inversions are present), dew point spread, and clouds can all have effects on radar that produce clutter, often right where you or your traffic are. In addition, the angle at which the radar antenna is tilted can result in some traffic not being seen at certain altitudes. Statistics show that the bulk of IFR traffic—the kind Center radar is primarily interested in, remember—spends most of its time at relatively high altitudes while en route, so that is what the en route radar is designed to see.

In terminal areas, the heavy traffic areas are within 30 miles of the airport at altitudes varying with the location; again, the radar is focused for the area of greatest use. At 40 miles out you are in all likelihood within range of the radar signals, but the controller's scope may only be displaying targets closer in. Another factor to keep in mind is that there is virtually always a cone of non-coverage directly overhead the radar antenna. All these things leave some rather wide open air spaces where there is no VFR radar coverage at many altitudes.

Certain kinds of general aviation aircraft are detected by radar with more difficulty than are others. Smaller airplanes; these made in great part of materials other than metal; aircraft without propellers; and slow moving craft all have less reflecting ability than others, resulting in less return of energy to the radar antenna. Consequently, the primary targets they produce are weak or often non-existent. An airplane also presents less of a target to the controller when it is flying directly toward, or directly away from, the radar antenna.

Weather Radar

The airman's oldest adversary—weather—often enters the picture. One of the current current uses of radar, other than air traffic control, is in weather observation and forecasting, and weather returns tend to blot out aircraft. True, controllers can lessen to some extent the strength of weather returns, but this ability is not absolute and often times it is desirable to display weather for use in vectoring aircraft around rough areas or storm cells. Other aircraft may be "wiped off the scope" by this display.

In short, the concept of 100 percent radar coverage has to be understood in terms of stated goals, present and future. Questions put to FAA "Listening Sessions" reveal that some pilots believe any time they hear "Radar Contact" the controller has taken over all separation responsibilities. At the very least, these pilots believe all air traffic in the area is shown on the controller's scope. This assumption can be a fatal error—for any of the reasons given earlier. Radar does not protect him from unidentified aircraft or those which may not be showing up clearly on the radar scope, such as VFR traffic that has blundered into an IFR environment.

Radar advisories are an infinitely useful aid in helping the VFR pilot maintain his own separation, but they are not to be regarded as evidence that a controller has taken over responsibility for such separation.

What can the pilot do to increase the protection available from radar?

- Much of the problem could be solved by the acquisition and use of a transponder. If you have never visited an air traffic facility with radar, do so and see the difference on the scope between a transponder reply and the blip from a non-equipped light aircraft. The contrast could surprise you—the typical transponder ident "slash" is many times the size of the small dot that represents the non-equipped airplane. Transponders make the size of the airplane irrelevant; transponder replies are the same size for a 747 and for your *Cherokee*.
- If you have a transponder, use it. That is what you bought it for. Many pilots turn the transponder off when leaving terminal areas to "save" it or lengthen its operating life. There are two dangers in this practice: one is the weaker reply enroute that makes you less visible on the controller's scope, and the other is the possibility of forgetting to turn it back on at your destination area. By the time the destination controller asks if you can "squawk," it is long past the time that you should have been using the extra help of a transponder to show all your progress through busy airspace. It is true that you might not be sending a signal en route if you get out of an area of radar coverage, but what is wrong with leaving the set turned on to get you back on the scope as soon as you again enter coverage? Another advantage is that the target generated by the transponder does not easily get lost in clutter, between antenna sweeps or precipitation returns.
- You can help the radar controller help you by not adding to his workload unnecessarily when he is in the process of identifying your target. Remember that he may be looking at many unidentified blips on his scope. Knowing where you are at all times simplifies the task of establishing radar contact—and shortens the time when you are present as an "unknown."

Like all human-devised systems, the air traffic control system is not without fault or the possibility of error. But if you should happen to find yourself startled by the sight of another aircraft flashing past at uncomfortably close quarters, before you start condemning the system you might want to review honestly how well you have been carrying out your own responsibilities for the safety of your aircraft and its occupants.

Maybe it's time to throw that old security blanket out of the cockpit.

(From material presented by Charles Douglas, Central Region.)

VDP, the newest addition to the list of instrument alphabet combinations, stands for "Visual Descent Point." While perhaps not the most revolutionary development in a history of air navigation, the VDP is certain to be welcomed warmly by all the instrument pilots who are in the habit of making straight-in nonprecision (no glideslope) instrument approaches.

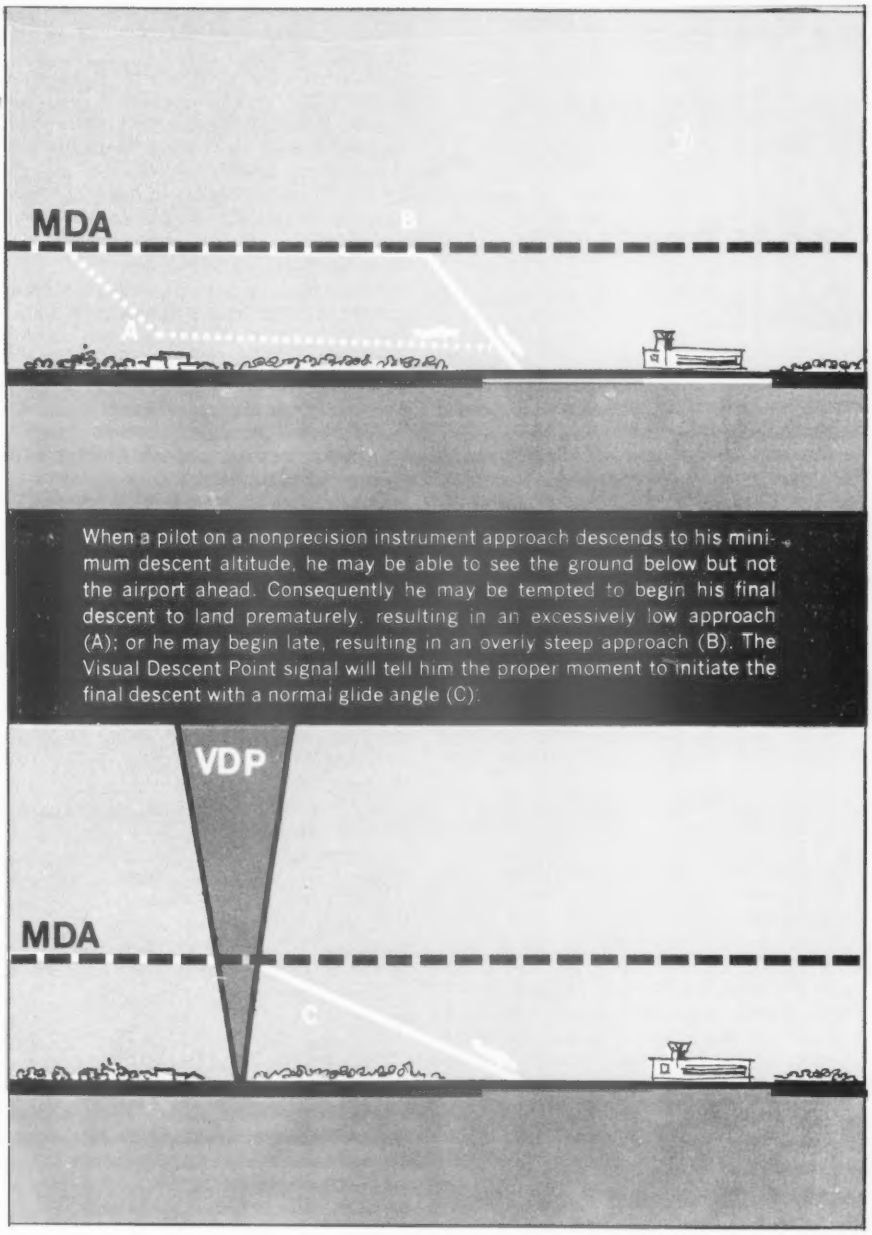
The Visual Descent Point is a specified point on final approach, electronically marked by either a DME fix or a 75 MHz marker beacon. For the pilot on a non-precision instrument approach the VDP provides a definite point to which he should proceed at or above the minimum descent altitude. It also identifies the point in his approach from which he can make a normal descent (about three degrees) to the touchdown point on the runway—if he has visual contact with the runway, lights, etc. If he reaches the VDP and does *not* see the ground, *a missed approach is likely.*

In the past the pilot flying a non-precision approach has had to rely on his experience and judgment to determine when he reached that point where he should be able to begin a normal descent to the runway by reference to the ground. Consequently this type of approach has been marked by many early or late descents from the minimum descent altitude.

For some time FAA has been considering the possibility of electronically marking the "visual descent point" on the final approach course of straight-in, nonprecision approaches. In coordination with the Terminal Instrument Procedures Advisory Committee, FAA is proceeding with the designa-

VISUAL DESCENT POINT

A new aid for pilots on nonprecision instrument approaches


MDA
B
A
When a pilot on a nonprecision instrument approach descends to his minimum descent altitude, he may be able to see the ground below but not the airport ahead. Consequently he may be tempted to begin his final descent to land prematurely, resulting in an excessively low approach (A); or he may begin late, resulting in an overly steep approach (B). The Visual Descent Point signal will tell him the proper moment to initiate the final descent with a normal glide angle (C).
VDP
MDA
C

tion of VDP's on certain approaches, and funds have been budgeted for additional DMEs and 75 MHz markers to identify such points. The first VDPs are expected to appear on charts within three months.

The first chartings will probably consist of DME fixes and be placed at locations where VORTACs are presently in service. In general, 75 MHz fan markers will be used for NDB approaches when no VORTAC is installed and where DME is not practical. Plans call for VDPs to be phased in over a several year period.

Neither the capability to receive the Visual Descent Point nor its use will be mandatory for an approach, even though a VDP has been specified for that particular procedure. If the airplane is not equipped to receive the VDP the pilot simply flies the approach as though no VDP had been provided.

The pilot needs no special technique to use the VDP. The approach is flown as always from the final approach fix to the landing (or to the missed approach point). The only difference is that with the VDP the pilot will be able to pinpoint precisely that spot from which he can make a normal three degree descent to the touchdown point on the runway. In most cases visual approach slope indicators (VASI) will be installed on these runways to further aid the pilot in maintaining a proper glide angle during the final stages of the approach.

A new FAA Advisory Circular (AC 90-70) is available free from DOT/FAA Distribution Unit, TAD 443.1, Washington, D.C. 20590.

Famous
FLYERS

Indestructible Eddie

Edward Vernon Rickenbacker at the wheel of a *Blitzen Benz* during his car racing days.

Stamina, luck and guts, plus a keen zest for survival were responsible for Captain Eddie Rickenbacker's long life span of 82 adventuresome years—including the 25 days on an open, unprovisioned raft under the baking Pacific sun. A man of steel nerves and seemingly indestructible constitution, his scrapes with death on land, at sea and in the air were many, but he always came out on top. It was just his way of doing things.

Edward Vernon Rickenbacker was born on October 8, 1890 in Columbus, Ohio, where his father worked on the railroad. The family, with eight children, was a close-knit group where unashamed American patriotism and a strict religious atmosphere were part of their family life.

Eddie had his first solo "flight" at the tender age of 10, before the era of powered flight had officially begun. Borrowing a big farm-wagon umbrella, he attached it to a bicycle and planned to take off from a neighboring barn with a steep-slanting roof. However, being "careful," as he claimed to be throughout his life, he hauled in a load of sand to provide a soft place to land—just in case. As the youthful pilot described it later: "We left the roof, the umbrella gave a loud pop, and turned completely inside out. The next thing I know I hit the sand. Thanks to it and the good Lord, I was only stunned."

When young Rickenbacker's father was killed in a construction accident, Eddie felt obliged to assume the responsibilities of family head. Although only 13, he left school and started working, first in a glass factory, then in a steel mill, a brewery, shoe factory; then as a stone cutter, lathe machinist and auto repairman—all in three years. Incidentally, one of his earliest and proudest accomplishments was to design and carve his father's tombstone. The habit of hard work became ingrained in his character and never left him.

Meanwhile a correspondence school course in mechanical engineering helped him fall in love with the internal combustion engine. His first "real" job was working for a builder of racing cars, and at age 16 he was driving in major competition. Car racing by this time had become a popular and dangerous sport, and one in which Eddie was to become a well-known fixture.

For the next ten years Eddie Rickenbacker was a mechanic, top notch racer, salesman and promoter of all types of automobiles. He developed such an affinity for engines he claimed he could identify any kind of car trouble by just listening to it run. He raced with such well-known figures as Ralph De Palma and Barney Oldfield, fierce competition in which ". . . there were times when the angels' wings were hovering," but he managed to walk away from numerous smashups with scarcely a limp. By the time he was 21 he had become one of the great racing drivers of the country, winning seven national championships.

In October 1916, touring out West, he was driving near Riverside, Calif., when he noticed a small plane parked in a grassy field. Driving closer he was greeted by a young man who introduced himself as Glenn Martin, and offered Eddie a ride in his plane. A short flight convinced him that his future was in the sky.

With the onset of World War I Eddie was quick to see that a new concept of the airplane as an offensive weapon was taking hold, as pilots were developing new techniques of combat flying. Eddie enlisted the help of a number of expert racing drivers into what he called the Aero Reserves of America, but aroused no interest in the U.S. Army Signal Corps, under whose jurisdiction American military flying came.

Less than two months after American entry into the war, Rickenbacker was sworn in as a sergeant. Because of his knowledge of mechanics, he went overseas as a driver attached to General Pershing's staff. Of course Eddie's greatest ambition was to fly, and after many requests and much string pulling, he became a military pilot trainee. With his inate feeling for things mechanical, he had no trouble learning to fly, and within a few months was on duty with the 94th Aero Pursuit Squadron, the first American group to go into action on the Western Front—their prime target was the redoubtable Baron von Richthofen's "Flying Circus."

With no parachutes, radios or maneuverable guns, Eddie fought more than a hundred air battle over France and Germany in a few short months, brought down 26 enemy aircraft, and was named the Allies' "Ace of Aces." Yet he always denied being reckless and insisted he was "a most careful pilot." His citations and medals covered many fields, from the Boy Scouts' Silver Beaver with Ribbon, to the Congressional Medal of Honor and Croix de Guerre.

After returning home a hero, Eddie found no promising outlet for his interest in aviation, and turned once again to automobiles.

Backed by a group of financiers in 1920, he designed and manufactured a sports car, the *Rickenbacker,* which introduced four wheel brakes. Sales went so well that he decided to take on a partner and was married on September 16, 1922. Two sons were born later on, David Edward (1925) and William Frost (1928). His automobile company, like many others in the '20's, folded quickly. Captain Eddie joined General Motors and was made general manager of their money-losing subsidiary, Eastern Air Lines, in 1929. Within a year Eddie became the first man to get consistent profits from this newcomer to modern transportation, without a government subsidy. And he did it for the next 25 years.

When General Motors decided to sell the airline in 1938, Rickenbacker scrounged up $3.5 million from backers and bought the airline; from then on it was his baby. Exam-

Rickenbacker, with his celebrated "Hat in the Ring" *Spad,* brought down 26 enemy aircraft.

ining every mile of the EAL system with his experienced critical eye, Captain Eddie built it into a big money-maker. He started the first (air carrier) 40-hour week, pension fund, and stock option plans and built up one of the finest safety records of all airlines.

The American involvement in World War II brought Eddie once more into national limelight. He was placed on special duty by the President to buildup troop morale, and to evaluate various military aircraft.

On October 21, 1942, Eddie took off in a B-17 from Honolulu for New Guinea, where General MacArthur was directing Pacific operations. The first stop enroute was to be Canton Island, a tiny speck of land, not very far from Howland Island, where Amelia Earhart was lost. The crew overshot their mark in the vastness of the Pacific, ran out of gas, radioed an SOS that nobody heard, and splashed the big plane down on the waves. Three rafts were immediately released and manned by Eddie and the crew.

Day after day eight men rode the ocean swells, living on four oranges, a few fish and rain water, as the emergency rations had unfortunately gone down in the plane. A dead calm set in, under a blistering sun, and depression and fear began to take their toll, despite Captan Eddie's assurances that he had survived tougher scrapes, and he intended to survive this one. An incident occurred on the eighth day of their ordeal that has since become history. Wearing his battered old felt hat, Eddie felt a seagull land on his head. Knowing it meant food, and with the eyes of the famished crew focused on him, he slowly raised his hand up to his hat and blindly grasped the bird's legs. Defeathered and divided into eight pieces, it was a "delicious feast" that rekindled all their spirits.

After 24 days on the open sea, Eddie and six other survivors were rescued by a Navy seaplane. Eddie recovered and went on to confer with MacArthur.

When the war was over Eddie returned to Eastern Air Lines with his usual dynamic vigor, wrote a book on his ocean adventure, *Seven Came Through*, became a popular lecturer, and turned down suggestions he run for the Presidency of the United States.

In 1963, at the age of 70, Rickenbacker stepped down from the chairmanship of his airline. For the next 10 years he travelled all over the world as a good-will ambassador of the aviation industry and the nation, promoting the ideal of peace among all people. He always spoke as a dedicated American with great respect for the flag and the American tradition. He died in 1973.

Eddie Rickenbacker, who never graduated from grammar school, was awarded honorary degrees from fourteen colleges and universities. He was admired as much for his steadfast morality and refusal to accept defeat or dishonor, as for his accomplishments as a pilot and pioneer airman. On facing death he wrote, "It is the easiest thing in the world to die. The hardest is to live." ■

BRIEFS

ENGINEERING DESIGNEES. The list of Designated Engineering Representatives who are available for consulting work has been updated by FAA. These designees are authorized by FAA to approve certain types of design data as complying with the FARs within particular categories, and their services have proved helpful to homebuilders of aircraft. Persons interested in becoming designees should contact the nearest FAA Engineering and Manufacturing Branch or Aircraft Engineering Division. Advisory Circular AC 183.29-1J, "Designated Engineering Representatives," is free.

■ CRASH SURVIVABILITY. Beech Aircraft has become the first general aviation manufacturer to install shoulder harness as standard equipment. Because of the inherent safety advantages, the company has decided to voluntarily install inertial reel shoulder harness on every forward-facing passenger and crew seat in all current production Beechcraft.

EARLY START. School classes that wish to build aircraft as part of the curriculum in industrial arts, science and aviation classes now have access to some 120 technical representatives of the Experimental Aircraft Association, who give their time without charge. Over the past 20 years 125 schools have participated in aircraft building projects and upwards of 60 such aircraft have been completed under EAA's "Project Schoolflight" (see "Schoolbuilt Airplanes," FAA GENERAL AVIATION NEWS. July 1976). For a list of the EAA volunteer tech-reps, or for more information, write Ben Owen, Executive Assistant, EAA, P.O. Box 229, Hales Corners, Wis. 53130.

THE REAL THING. Aircraft replacement parts are sometimes sold as "aircraft quality" when actually the quality and origin of these units are unknown. Advertising for such merchandise sometimes indicates, deceptively, that it is approved for use in certificated aircraft. Furthermore, users of such items may not be aware of the potential hazard involved with using unapproved replacement components. In addition to the safety factor, the use of unapproved replacement parts could result in the mechanic, who signs the aircraft off, and/or the owner, being in violation of the FARs. An updated FAA Advisory Circular explains how to identify approved serviceable replacement parts; ask for AC 20-62C, "Eligibility, Quality and Identification of Approved Aeronautical Replacement Parts."

■ HOW HIGH THE SKY? A recent FAA order establishes the siting criteria for "cloud height indicators" at airports, in coordination with the National Weather Service of the National Oceanic and Atmospheric Administration, who have the responsibility for setting and maintaining meteorological standards for the aviation weather program. Cloud height indicator equipment is to be collocated with the center field wind equipment, with information relayed via cables to the tower and/or the FSS facility.

Advisory circulars mentioned are available free from DOT/FAA Distribution Unit, TAD 443.1, Washington, D.C. 20590.

ELEMENTARY COURSE IN DEFYING THE ELEMENTS. Pilots in Alaska have an opportunity to learn igloo building from Eskimo experts as a means of survival following emergency landings inside the Arctic Circle. Requiring only a knife as a tool plus proper technique, the igloo is the best means of conserving body heat when lost in the land of the big snow.

Waivers No Longer Required For Wearing Contact Lenses

A new FAA rule which became effective December 21 allows pilots to wear contact lenses for distant vision correction without a medical "waiver." In the past FAA medical standards allowed visual correction only by eye glasses. A waiver was needed if the pilot wanted to substitute contact lenses for the glasses. The new rule eliminates the time-consuming waiver procedures for distant vision. (Near vision rules remain unchanged; use of contact lenses for near vision is not considered acceptable for aviation purposes.)

The rule change was prompted by a petition from AOPA which stated that the use of contact lenses creates no sudden unpredictable hazards to flight and in some cases are actually superior to glasses, since there are no frames to obstruct peripheral vision. A proposal was issued in September 1975 and when the comments received favored the change the final rule was drafted by FAA.

Metal Fatigue Conference

An FAA Regulatory Review Conference scheduled for March 15-17 will be specifically concerned with structural fatigue requirements for transport category airplanes. The three-day meeting is one of a series of regulatory conferences being conducted by FAA to review and update the FARs.

The conference agenda will be based on proposals which have been submitted by the aviation industry, the public and FAA. Following the conference, which is open to the public at no charge, FAA will initiate normal rulemaking action to amend the structural fatigue requirements for transport category airplanes set forth in Part 25 of the FARs.

The conference will be held at the Sheraton-National Hotel, Arlington, Va., beginning at 9:00 a.m. on March 15, 1977. The agenda will be available by February 9.

Security Thwarts Skyjacking

The passenger screening program at airport terminals continues to be effective in keeping firearms and explosives off aircraft, according to a recent report by FAA. During the first six months of 1976 the screening program detected 2,840 firearms (1,054 of which were handguns) and seven explosive or incendiary devices. There were 422 persons arrested for attempting to carry such objects on board aircraft.

There was no successful hijacking of a U.S. airliner during the first half of 1976, although there was a "bluff hijacking" where the hijackers constructed dummy bombs after they were on board to effect a takeover. The jetliner, crew and passengers were returned safely. The hijackers were taken into custody and are now facing Federal and local prosecution.

Four States Will Test-Manage General Aviation ADAP Funds

Four states have been chosen to participate in an FAA "demonstration program" under which they will be responsible for administering Federal funds for the deve'opment of their general aviation airports. States selected are Arizona, Michigan, Pennsylvania, and South Dakota. The program is designed to help FAA evaluate the capability of state agencies to manage funds now controlled by FAA and to see if this type of arrangement can produce more cost-effective results.

All 50 states were invited to apply for the special program, and twenty did so. Selection was made on the basis of location, relative significance of general aviation in the state, etc. Participating states will make their own priority allocation of general aviation ADAP funds for fiscal years 1977 and 1978 in contrast to the usual procedure where FAA determines priorities and deals directly with airport sponsors, or channels the money through a state agency.

Unneeded Airport Lights Out

An FAA campaign to eliminate unnecessay obstruction lighting on buildings and towers has saved an estimated two million kilowatt hours of electrical energy over the past two years. Approximately 1,200 lights, varying from 100 to 700 watts, have been turned off or removed from over 200 structures where they were no longer deemed necessary.

The energy-saving campaign has saved some 1,000 tons of coal or 330,000 gallons of oil. In addition it has prevented more than 155,000 pounds of sulfur dioxide from being emitted into the atmosphere.

FAA plans to continue the campaign to eliminate unnecessary obstruction lighting wherever it can be done without affecting flight safety. Anyone desiring an FAA review of existing obstruction lights to see if they are still needed should contact the FAA Regional air traffic control office.

ADAP-approved NAVAIDS

Aviation NAVAIDS that are approved for funding under the FAA Airport Development Air Program are listed in a new advisory circular. The Airport and Airway Development Act of 1970 includes under the definition of airport development, "Navigation aids used by aircraft landing at, or taking off from, a public airport." Included are instrument landing systems (ILS); distance measuring equipment (DME); nondirectional radio beacons (NDB); Terminal VOR; and interim standard microwave landing systems. The publication lists specifications and performance requirements for these items, and tells manufacturers who wish to have their equipment listed in the document how to go about it. AC 150/5100-12 "Electronic Navigational Aids Approved for Funding Under the Airport Development Aid Program (ADAP)" is free from DOT/FAA Distribution Unit, Washington, D.C. 20590.

Latest Word on Test Guides

New study guides for written airman tests will contain many questions that may be asked on the actual test, but not necessarily all of them—as suggested in an earlier news article. A just published Advisory Circular (FAA AC 60-15) states that the new test study guides will contain "representative questions and responses used in the current FAA certification tests." Furthermore, the actual test questions will be modified whenever pertinent regulatory or policy changes are made, whereas revisions to the study guides will be made only during the normally scheduled revision cycle for that particular guide. Readers will be informed as to publication dates and prices of the new test study guides.

• Sailplane Safety

I enjoyed your September article "On Silent Wings," and agreed with all of it except your equating "fairly abrupt stall characteristics" with high performance sailplanes. The F. X. Wortman airfoils used on most of the current generation of plastic gliders gives us about the kindest stall qualities imaginable, including plenty of warning and simple recovery. The spin accident you described in your article about the SH1 did have bad stall and spin qualities, but it was designed over ten years ago, and was about the last of the nonglass gliders.

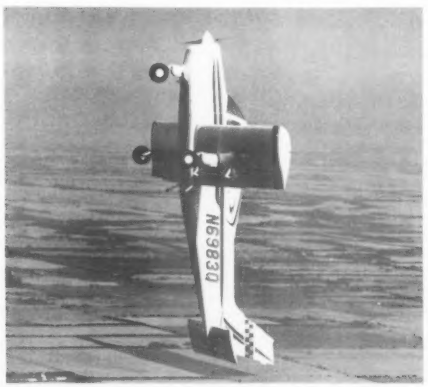
To me a big danger in sailplane flying that I never see mentioned is the attitude of many power pilots looking for a new "trendy" experience and rating addition. Compared to their prop experience, flying a glider may appear deceptively simple to them, and many have no feeling for the judgment background it takes such a long time to build up in order to handle glider experiences safely. Any glider instructor can supply details of such incidents.

Ned Jacoby
Balboa, Calif.

• An Illegal Photograph?

We enjoy reading your magazine and find its information timely and helpful. In reviewing your September 1976 issue we find a photo appearing on page 15 of Beech N6983Q. In view of existing airworthiness directives we find that the subject airplane, through inspection, is in non-compliance with the applicable AD for acrobatic flight. Among other things the ventral fin required by the AD is not present. We suspect you may have used an airplane photograph pre-dating the issue of these ADs.

W. H. Schultz
Beech Aircraft Corp.
Wichita, Kansas



Your suspicion about the photo being pre-AD is correct and we thank you for calling attention to the oversight.

• Looking Glass

In "Survival in the Sun" in your August issue you listed, as part of a Basic Desert Survival Kit, a mirror for signalling. Can you tell me where to purchase such a mirror, and what type to ask for? Are they expensive?

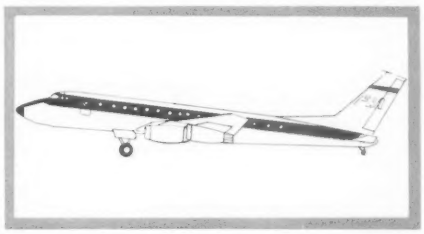
W. A. Curry
Columbus, Neb.

Specially designed "signal mirrors" are generally available at stores that carry sporting goods and camping supplies. Look for a mirror that is unbreakable (stainless steel), double-faced, and with a hole in the center to assist in aiming the reflection. It should cost no more than a dollar.

• Wheel on the Wrong End

When I saw your statement in October that the DC-8 has a tailwheel I thought it was a typographical error, but I called "Wrong End" O'Rourke to ask his opinion. I'm sure you know O'Rourke, the famous old time pilot and expert on aircraft oddities. He lives in a little cabin in the Adirondacks. He said you were right, the DC-8 was built with a tailwheel, but the manufacturer put it in front. In that position it's called a "training wheel." As soon as the crews learn to fly the DC-8 they are upgraded to the DC-3.

Thomas O'R. Gallagher
Sayville, N. Y.



Our thanks to O'Rourke for his ingenious explanation and to Glen Simecek for his drawing of the imaginary tail-wheel DC-8.

• Pills for Pilots

Can you give me information concerning medications that pilots with heart disease may be permitted to use and still qualify for medical certification?

Clairon, Pa.

While many drugs are known to have potential side effects that are contraindicated in aviation, it is ordinarily not the drug itself that is disqualifying, but rather the underlying medical condition. For this reason, and because certification practice (including special issuances and exemptions) is aimed at individualization, it would be inappropriate and somewhat misleading to attempt to provide a list of unequivocally disqualifying drugs.

However, if you could be more specific in your question (by advising us of the type of drug you have questions about and the basic medical condition involved), we will attempt to provide you with a direct answer. Or, you could consult your regional FAA Flight Surgeon.

• Chrome Plating Cylinders

I have a chromium plating business and would like to look into plating cylinders on aircraft engines. Please let me know who I can write to concerning certification (if necessary) specifications, etc.

Samuel Bianca, Jr.
Metuchen, N.J.

In order to chrome plate aircraft cylinders it is necessary for you to apply for an FAA repair station certificate and to develop a "process specification" and have it approved by FAA, or else to purchase from another firm a previously approved process specification. You can obtain more complete information from an airworthiness inspector at your nearest FAA Flight Standards District Office.

FAA GENERAL AVIATION NEWS welcomes comments from our readers. No anonymous letters will be used, but names will be withheld on request. Address: FAA GENERAL AVIATION NEWS, AFS-807, Washington, D.C. 20591.

• Vision Standards for Pilots

I have a question on medical certificates for pilots. To be an instructor you need at least a second class medical. I have only a third class medical, the reason being that my eyes are poorer than the minimum 20/100 uncorrected required for the second class medical. I do not understand the rationale behind this rule. With glasses on I can see as well as any other pilot who has a second class medical certificate. Why are you so concerned about unaided vision when I always fly with glasses on?

James M. Culver
Salt Lake City, Utah

In flight operations, there is always a possibility of displacement of spectacles or a contact lens during a critical phase of flight. This is one important reason why higher vision standards are required for holders of second class medical certificates, since their duties and responsibilities may be greater or more complex than those associated with third class certification. It is also a fact of concern that distortion of peripheral vision is greater in lenses of high refractive power.

However, while FAA believes that a higher medical standard must be applied to persons involved in commercial operations (including flight instructors) we do recognize the need to evaluate each case independently. Thus, FAR 67.19 provides for the special issuance of medical certificates to applicants who do not meet certain of the established medical standards. To find out if you qualify for such special issuance, contact DOT/FAA, Civil Aeromedical Institute, AAC-134, P.O. Box 25082, Oklahoma City, Oklahoma 73125.

INSTRUMENT CORNER

• Intersection Ident

Please settle an IFR disagreement for me. During an instrument flight, in order to identify an intersection along an airway (for course change, holding, etc.) are you allowed to use only the VOR radials that are indicated by arrows on the chart? An instructor has insisted to me that you are limited to those shown, even if it means tuning your VORs away from the station that provides your airway. I disagree. Who's right?

William M. Fiefer
Aurora, Ill.

Pilots are not limited to arrow-marked radials for intersection identification. You may continue to navigate on the airway and use other published radials or DME distances to determine intersections, as long as the facility you are using is close enough, and the angle of intersection with the airway is large enough (at least 30 degrees) to provide an accurate indication. You should not use a facility located beyond changeover point. If using DME, use a station on the airway, fore or aft of your position.

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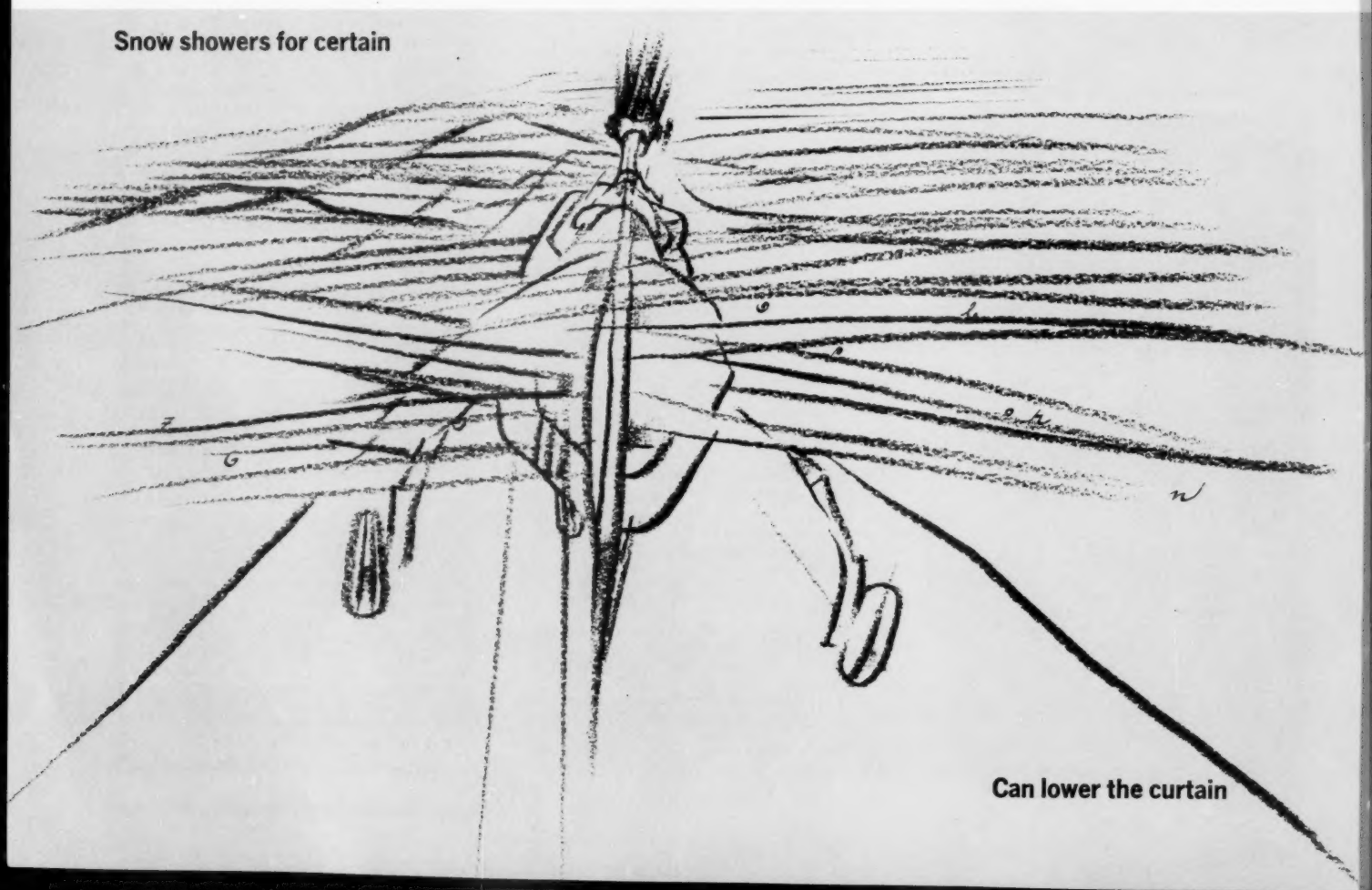
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